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EXAMINER

BELL, MELTIN

ART UNIT	PAPER NUMBER
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2121

DATE MAILED: 11/06/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/881,746

Applicant(s)

BELLA ET AL.

Examiner

Meltin Bell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ ^{NO} Claim(s) 1-23 are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 June 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:



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DETAILED ACTION

This action is responsive to application **09/881,746** filed 6/18/01.

Claims **1-23** have been examined.

Priority

Applicant's claim for domestic priority under 35 U.S.C. 119(e) is acknowledged for provisional application number 60/212,050 filed **6/16/00**.

Information Disclosure Statement

Applicant is respectfully reminded of the ongoing Duty to disclose 37 C.F.R. 1.56 all pertinent information and material pertaining to the patentability of applicant's claimed invention, by submitting in a timely manner PTO-1449, Information Disclosure Statement (IDS) with the filing of applicant's application or thereafter.

The information disclosure statement filed 4/5/02 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because of missing or inaccurate information in the listing:

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- The copyright year at the bottom of the first page differs from the handwritten publication date at the top of the first page for the Bosschere et. al. reference.
- The month of publication (August) is missing from the Archibald et. al. reference.

It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Drawings

The United States Patent and Trademark Office of Draftperson's Patent Drawings Review have reviewed the formal drawings.

The drawings have not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is required in correcting any errors of which applicant may become aware in the drawings.

The drawings are objected to because:

- The Spatial Relations Subsystem item 110 of FIG. 1A, 1B should be shown as item 116.
- Item 104 is duplicated in FIG. 3.
- The Bayesian network 114 of page 22, line 6 is not shown in FIG. 1A, 1B.

- Item 302 of FIG. 3 should be 'truth data files' instead of 'truthed data files' as indicated on page 27, line 17.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is required in correcting any errors of which applicant may become aware in the specification.

The disclosure is objected to because of the following informalities:

- FIG. 1A should be substituted for FIG. 1 on page 10, line 14.
- 110 should be substituted for 116 on page 11, line 22.
- The item number is missing for spatial relations processing on page 17, lines 10-11.
- 114 should be substituted for 104 on page 18, line 19.
- The Judea Pearl paper of page 23, line 8 is not included in an IDS.
- The Neopolitan reference of page 24, line 18 is not included in an IDS.
- The Cooper reference of page 24, line 22 is not included in an IDS.
- The Jagannathan reference of page 48, line 22 is not included in an IDS.
- 126 should be substituted for 120 on page 27, line 18.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim structure is that of a run together sentence where the last part of the sentence "a stub function...will be executed" confuses the meaning of the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6, 8-11, 14, and 18-21 are rejected under 35 U.S.C. 102(b) as being anticipated by *Lin et.al.* (November 1991).

Regarding claim 1, 3-5, 8-11, 14, 18, 20-21:

Lin et.al. teaches,

- a blackboard based expert system for recognizing medical objects (p. 480, Abstract, sentences 1-3, "Dempster-Shafer...meaningful entities")

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- probabilities, relationships, belief networks and models (p. 480, section 2, paragraph 2, sentences 1-4, "Within a product space...basic probability assignments")
- data comprising original input data and data created by processing of any of said plurality of experts (p. 428, section 4, paragraph 1, "Given a set...analysis tools")
- a controller operative to control said experts (p.484, section 4.2, sentences 2-4, "The result...recognition process"; Figure 5)
- relations subsystems (p.484, section 4.2, paragraphs 2-3, "Each HKS...predetermined strategies"; Figure 6)

Regarding claim 2:

Lin et.al. teaches,

- region identification expert recognizers (p. 482, section 4.2, paragraph 2, sentence 2, "In phase one...segmentation algorithm")

Regarding claim 6:

Lin et.al. teaches,

- rules in the belief model (p. 481, section 3, sentence 2, "In the proposed model...form of multivariate belief functions")
- physically related classes (p.482, section 4, paragraph 2, sentence 4, "The second...in the image")
- spatially related classes (p. 483, section 4.1.3, paragraph 4, sentence 1, "Spatial relationship...plane is predefined")

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Regarding claim 19:

Lin et.al. teaches,

- adaptability in the belief model (p.482, section 4.1.1, paragraph 1, sentence 1, "A signal-based adaptive...are computed")
- thresholding in the belief model (p. 482, section 4.1.2, paragraph 3, sentence 1, "According to...multi-thresholding method")
- supporting execution of experts based on the outputs of currently executing experts (p.484, section 5, paragraph 2, sentence 3, "The HKS with the best support...results from the previous phase")

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the Office presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the Office to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 7, 12-13, 15-17 and 22-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Lin et.al.* (November 1991) in view of *Alden* U.S. Patent Number 5,418,888 (May 23, 1995) and further in view of *Kortge* U.S. Patent Number 6,058,206 (May 2, 2000).

Regarding claim 7:

Lin et.al. teaches,

- the presence and absence of objects (p.482, section 4.1, paragraphs 1, sentence 2, "The first two...certain anatomical structures")

However, *Lin et.al.* doesn't explicitly teach predicting the existence of shadow objects when there are no shadow object recognizing experts while *Alden* teaches,

- predicting unrecognized objects:

- (column 46, lines 6-16, "the mere fact...then always do the following")
- (column 47, lines 61-63, "the firing behavior...predicted by the test tables")

Motivation – The portions of the claimed system predicting the existence of shadow objects would have been a highly desirable feature in this art for

- avoiding search strategies problems, increasing system running speed and easing programming/debugging (*Alden*, column 4, lines 3-15, "The invention achieves...correctly constructed")
- overcoming drawbacks of Bayes' methods in manipulating measures of beliefs (*Lin et. al.*, section 1, sentences 10-11, "Although the traditional...(D-S) theory")

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to combine *Alden* with *Lin et. al.* to obtain the invention specified in claim 7, predicting the existence of shadow objects when there are no shadow object recognizing experts. The modification would have been obvious because one of ordinary skill in the art would have been motivated to improve the system running time and the manipulation of beliefs within the belief model of the system.

Regarding claim 12-13:

Lin et.al. teaches,

- relations subsystems (p.484, section 4.2, paragraphs 2-3, "Each HKS...predetermined strategies"; Figure 6)

However, *Lin et.al.* doesn't explicitly teach determining temporal relations while *Kortge* teaches,

- temporary storage in the weight updating code (column 14, lines 55-57, "the part mapping...code of FIG. 9")

- the after type (column 10, lines 65-66, "One use of...for future use")

- the before type (column 14, lines 4-11, "because the noisy-OR...FIG.3")

- the exists with type (column 1, lines 27-29, "Feature based recognition...exist within the pattern")

Motivation – The portions of the claimed system determining temporal relations would have been a highly desirable feature in this art for

- improving upon previous methods (*Kortge*, column 2, lines 41-44, "reducing the learning...features being learned")

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- offering performance comparable to that of a human expert (*Lin et. al.*, section 1, sentence 1, “An expert... specialized problem domain”)

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to combine *Kortge* with *Lin et. al.* to obtain the invention specified in claims 12-13, determining temporal relations. The modification would have been obvious because one of ordinary skill in the art would have been motivated to manipulate beliefs within the belief model of the system for reducing the learning time.

Regarding claim 15-17:

Lin et.al. teaches,

- a controller operative to control said experts (p.484, section 4.2, sentences 2-4, “The result... recognition process”; Figure 5)

Alden teaches,

- predicting unrecognized objects (column 46, lines 6-16, “the mere fact... then always do the following”)

However, *Lin et.al.* and *Alden* don’t explicitly teach a learning system in belief model generation while *Kortge* teaches,

- learning systems in feature based adaptive pattern recognition (column 1, lines 21-26, “In such circumstances... than other approaches”)
- a controlled statistics space (column 13, lines 11-20, “My preferred inference... the network model”)

Motivation – The portions of the claimed system using a learning system in belief model generation would have been a highly desirable feature in this art for

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- tolerating noise (*Kortge*, column 1, lines 25-26, "in general...other approaches")
- avoiding search strategies problems, increasing system running speed and easing programming/debugging (*Alden*, column 4, lines 3-15, "The invention achieves...correctly constructed")
- offering performance comparable to that of a human expert (*Lin et. al.*, section 1, sentence 1, "An expert...specialized problem domain")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to combine *Kortge* with *Lin et. al.* and *Alden* to obtain the invention specified in claims 15-17, learning systems in belief model generation. The modification would have been obvious because one of ordinary skill in the art would have been motivated to reduce learning time and the likelihood of poor features being learned while increasing accuracy and flexibility.

Regarding claim 22:

Lin et.al. teaches,

- Dempster-Shafer Reasoning for Medical Image Recognition (title)
- the presence and absence of objects (p.482, section 4.1, paragraphs 1, sentence 2, "The first two...certain anatomical structures")

Alden teaches,

- predicting unrecognized objects:
 - (column 46, lines 6-16, "the mere fact...then always do the following")
 - (column 47, lines 61-63, "the firing behavior...predicted by the test tables")

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- cooperative object recognition experts (column 45, lines 23-29, "When another...common objects")

However, *Lin et.al.* and *Alden* don't explicitly teach a learning system in belief model generation while *Kortge* teaches,

- learning systems in feature based adaptive pattern recognition (column 1, lines 21-26, "In such circumstances...than other approaches")

- scaled performance and parallel processing (column 2, lines 55-65, "the assumption is...the input layer")

- multiple processors

- (column 2, lines 66-67, "A further...one such")
- (column 3, lines 1-2, "system and...another system")

- higher accuracy (column 13, lines 22-26, "This effectively allows...accurate recognition overall")

Motivation – The portions of the claimed method using a learning system in belief model generation would have been a highly desirable feature in this art for

- tolerating noise (*Kortge*, column 1, lines 25-26, "in general...other approaches")
- avoiding search strategies problems, increasing system running speed and easing programming/debugging (*Alden*, column 4, lines 3-15, "The invention achieves...correctly constructed")
- overcoming drawbacks of Bayes' methods in manipulating measures of beliefs (*Lin et. al.*, section 1, sentences 10-11, "Although the traditional...(D-S) theory")

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Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to combine *Kortge* with *Lin et. al.* and *Alden* to obtain the invention specified in claim 22, learning systems in belief model generation. The modification would have been obvious because one of ordinary skill in the art would have been motivated to manipulate the belief model for reducing learning time and the likelihood of poor features being learned while increasing accuracy and flexibility.

Regarding claim 23:

Lin et.al. teaches,

- Dempster-Shafer Reasoning for Medical Image Recognition (title)
- thresholding in the belief model (p. 482, section 4.1.2, paragraph 3, sentence 1, "According to...multi-thresholding method")

Alden teaches,

- adding an output's class to a blackboard (column 45, lines 23-29, "When another...common objects")
- creating a rule to control when supporting evidence is found to exceed an adaptable threshold (column 47, lines 3-10, "Criteria statements...certainty factor threshold")
- determining if output of said expert is new (column 28, lines 26-39, "During execution...would have fired")

However, *Lin et.al.* and *Alden* don't explicitly teach a learning system in belief model generation while *Kortge* teaches,

- learning systems in feature based adaptive pattern recognition (column 1, lines 21-26, "In such circumstances...than other approaches")

- creating an expert

- (column 2, lines 66-67, "A further... one such")
- (column 3, lines 1-2, "system and... another system")

- adding stub functions

- (column 6, lines 14-18, "it is typical... conventional training procedure")
- (column 29, lines 50-53, "The conversion... backprop net")

Motivation – The portions of the claimed method using a learning system in belief model generation would have been a highly desirable feature in this art for

- tolerating noise (*Kortge*, column 1, lines 25-26, "in general... other approaches")
- avoiding search strategies problems, increasing system running speed and easing programming/debugging (*Alden*, column 4, lines 3-15, "The invention achieves... correctly constructed")
- offering performance comparable to that of a human expert (*Lin et. al.*, section 1, sentence 1, "An expert... specialized problem domain")

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made, to combine *Kortge* with *Lin et. al.* and *Alden* to obtain the invention specified in claim 23, learning systems in belief model generation. The modification would have been obvious because one of ordinary skill in the art would have been motivated to manipulate the belief model for reducing learning time and the likelihood of poor features being learned while increasing accuracy and flexibility.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- *J.L. Alden*; "System for Relevance Criteria Management of Actions and Values in a Rete Network"; U.S. Patent Number 5,418,888; May 23, 1995
- *C.A. Kortge*; "Pattern Recognizer with Independent Feature Learning"; U.S. Patent Number 6,058,206; May 2, 2000
- *G.N. Macey, I.N. Bella*; "Automatic Method for Developing Custom ICR Engines"; U.S. Patent Number 6,571,013; May 27, 2003
- *B.G. Molloy*; "System and Method for Representing and Retrieving Knowledge in an Adaptive Cognitive Network"; U.S. Patent Number 5,787,234; July 28, 1998
- *W.-C. Lin, S.Y. Chen, C.-T. Chen*; "Dempster-Shafer Reasoning for Medical Image Recognition"; Proceedings of the 1991 IEEE Third International Conference on Tools for Artificial Intelligence; TAI '91; 10-13 November 1991; pp 480-487
- *W. Elliott, Dr. M. Schneider*; "Fault Finder"; Proceedings of the 1990 ACM SIGSMALL/PC symposium on Small systems; February 1990; pp 13-23
- *S.-Y. Chen, W.-C. Lin, C.-T. Chen*; "Spatial reasoning based on multivariate belief functions"; 1992 IEEE Computer Society Conference on Computer Vision and Pattern Recognition; Proceedings CVPR '92; 15-18 Jun 1992; pp 624-626

Any inquiry concerning this communication or earlier communications from the Office should be directed to Melvin Bell whose telephone number is 703-305-0362.

This Examiner can normally be reached on Mon - Fri 7:30 am - 4:30 pm.

If attempts to reach this Examiner by telephone are unsuccessful, his supervisor, Anil Khatri, can be reached on 703-305-0282. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

MB



ANIL KHATRI
SUPERVISORY PATENT EXAMINER